

LANDAU, L.

CZECHOSLOV. 1/Farm Animals - Cattle.

Q-3

Abs Jour : Ref Zhur - Biol., No 1, 1953, 2571

Author : L. Landau, M. Gazo

Inst :

Title : On the Problem of Calcium and Phosphorus Content in Cows  
During One Year Depending on Their Nutrition.

Orig Pub : Veterin. cazor. 1956, 5, No 6, 403-422 (Slovak)

Abstract : For the duration of one year, the Ca and P content was observed in the milk and blood serum of two groups of cows (14 cows in each group). Cows which received rich rations produced a milk yield of 12.7 liters on an average a day. The Ca content was 111.2 milligrams/100 milliliters. Cows on restricted rations and a milk yield of 11.5 liters showed a Ca content of 103.9 milligrams/100 milliliters. The respective content of P was: 87.1 milligrams/100 milliliters, and 88.1 milligrams/100 milliliters. The Ca

Card 1/2

CZECHOSLOVAKIA / Farm Animals. Swine

Q-4

Abs Jour: Ref Zhur-Biol., No 3, 1958, 12137

Author : Landau Ladislav, Majerciak Pavol

Inst :

Title : The Effect of the Regular "Fast" of Short Duration upon the Increase in Weight and Utilization of Feeds in Swine during Their Fattening (Vliyaniye regul'yarnogo kratkovremennogo "posta" na prives i ispol'zovaniye kormov u sviney vo vremya otkorma)

Orig Pub: Pol'nohospodarstvo, 1957, 4, No 2, 209-249

Abstract: Tests were carried out on 3 groups of young pigs. The first group (the control) was fed, on Sundays, three times, the second one - once, in the morning, and the third one was not fed during the whole day. After 163 days of fattening, the following results were reached: the average live weight was 131.1,

Card 1/2

CZECHOSLOVAKIA / Farm Animals. Swine

Q-4

Abs Jour: Ref Zhur-Biol., No. 3, 1958, 12137

Abstract: 122.84 and 121.9 kg. respectively; the average daily increase in weight - 658, 608 and 602 g.; the consumption of digestible protein per 1 kg. of weight increase - 0.40, 0.40 and 0.41 kg., and that of starch units - 3.01, 2.94 and 3.05; the weight of the carcass was 83.2, 82.2 and 81.6%. Fasting on Sundays, for not more than 18 hours, with the exclusion of the day and evening feeds from the feeding schedule, is considered admissible, while fasting for 24 hours is not allowable.

Card 2/2

Country : CZECHOSLOVAKIA  
 Category : Farm Animals. Domestic Birds. Q-4  
 Abs. Jour : Ref Zhur-Biol., No 16, 1958, 74134  
 Author : Landau, Ladislav; Marcinka, Kamil; Spronc,\*  
 Institut. : -  
 Title : The Relationship between the Quantity of Pro-  
 vitamin and Vitamin A in the Egg Yolk and the  
 Hatching of Chicks in Incubation.  
 Orig Pub. : Polnosodarstvo, 1957, 4, No 4, 641-664  
 Abstract : The first group (control) received the stan-  
 dard protein mixture, the 2nd received the  
 same mixture + fodder cabbage as desired +  
 1000-2000 of  $\gamma\beta$  -carotene daily, the 3rd re-  
 ceived the standard protein mixture + 3000 in-  
 ternational units of axerophthol-acetate dissol-  
 ved in vegetable oil. The results of the expe-  
 riments are (in the order of groups): average  
 egg-laying capacity 63.38; 60.87, and 62.23  
 eggs; the content of vitamin A in 100 g of egg  
 yolk: 602.8; 1087.4 and 776.8 international

Card: 1/3  
 \*Adolf

Card: 2/3

Country : CZECHOSLOVAKIA  
Category : Farm Animals.  
Domestic Birds. Q-4  
Abs. Jour : Ref Zhur-Biol., No 16, 1958, 74134  
Author :  
Institut. :  
Title :  
Orig Pub. :  
Abstract : shed chicks: 15.8; 34.6 and 48.2 international units; vitamin A stored in the liver of hens (per 100 g): 2117.1; 4394.5 and 81240.0 international units. -- G. A. Titov

Card: 3/3

CZECHOSLOVAKIA / Farm Animals. General Problems.

Q-1

Abs Jour: Ref Zhur-Biol., No 23, 1958, 105618.

Author : Landau, L.

Inst : Not given.

Title : Development of Cattle Breeding in Slovakia During the Last Ten Years and Its Future Prospects.

Orig Pub: Pol'nohospodarstvo, 1957, 4, No 6, 1171-1200.

Abstract: No abstract.

LANDAU L.

APPROVED FOR RELEASE: 06/20/2000

CIA-RDP86-00513R000928510018-7"

CZECHOSLOVAKIA / Farm Animals. Poultry.

Q-4

Abs Jour: Ref Zhur-Biol., No 23, 1958, 105755.

Author : Landau, L., Marcinka, K.

Inst : Not given.

Title : Effect of Vitamin E upon Reproduction and Upon Utilization of Vitamin A in Foods During Egg Laying.

Orig Pub: Veterin. casop., 1957, 6, No 4, 265-278.

Abstract: A control group of hens (White Leghorns) was fed standard protein mixture with the addition of 3,000 units of vitamin A. The Experimental group was given the same rations but with the daily addition to the feeds of 1 mg. of tocopherol. During the period of observation (November - December) the following results were obtained (according to groups): average egg production -

Abs. Jour : REBiol., No. 4, 1959, No. 16721

Q-4

Author :  
Institute :  
Field :

Orig. Pub. :

Abstract : ging to the 3rd category. -- G. A. Titov

Card: 3/3

BILEK, J., Dr.; JANCARIK, A., Dr.; KAFKA, K., Ing.; LANDAU, L., Dr.

Research on domestic animal physiology. Vestnik CSAZV 7 no.4:232-235  
'60. (EEAI 9:9)

(Czechoslovakia--Domestic animals)

KLECKA, Antonin, akademik; KOUBEK, Karel, akademik; FOLTYN, Jiri; SCHOLZ, Jaromir, akademik; LANDAU, Ladislav

Contemporary problems of agricultural science and practice; also, remarks by Karel Koubek, Jiri Foltyn, Jaromir Scholz and Ladislav Landau. Vestnik CSAZV 7 no.6/7:312-331, 361-369 '60. (EEAI 9:10)

1. Predseda Ceskoslovenske akademie zemedelskych ved (for Klecka).
2. Predseda II. odboru Ceskoslovenske akademie zemedelskych ved (for Koubek).
3. II. mistopredseda Ceskoslovenske akademie zemedelskych ved (for Foltyn).
4. Dopisujici clen Ceskoslovenske akademie zemedelskych ved (for Foltyn and Landau).
5. Reditel Vyzkumneho ustavu pro chov drubeze, Ivanka pri Dunaji (for Landau) (Czechoslovakia--Agriculture)

units. They were fed for 36 hours ad libitum, then starved for 12 hours, then killed and the content of vitamin A determined. The amount of the vitamin found corresponded to the logarithm of the administered dose. 59% of the vitamin was stored in the liver. 1 Figure, no references. Submitted at Bratislava, 9 Dec 65.

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928510018-7

LANDAU, Lev Davidovich (Acad.)

"The Problem of Damping in Wave Mechanics," Z. Physik 45, 430 (1927).

"The Diamagnetism of Metals." Z. Physik 64, 629 (1930).

*ew*

2

The theory of energy exchange in collisions. L. LANDAU. *Physik. Z. Sowjetunion* 1, 94-98 (1932).—A theory of adiabatic inelastic collisions is developed. Application of this theory to atom collisions of the second kind demonstrates that the azimuthal quantum no. of the entire system changes on collision always by  $\pm 1$ , which excludes transitions from two *S* states into 2 other *S* states. The corresponding collisional cross-section is proportional to  $\frac{(E - U)^{1/2}}{E}$ , where *U* is the energy at the point of intersection of both terms, in which the transition always occurs. The case of polyatomic mols. is discussed in general. Finally the process of nucleus excitation and disintegration without the capture of  $\alpha$ -particles is considered theoretically.

P. H. EMMETT

LANDAU, Lev Davidovich (Acad.)

664 "On the Motion of Electrons in a Crystal Lattice." Phys. Z. Sowjet. 3,  
(1933).

27

4628. Theory of Superconductivity. Part I. L. Landau. *Phys. Zeits. d. Sowjetunion*, 4, 1, pp. 43-49, 1933. In German. -The theory developed is based upon the saturation current produced inside each elementary volume of the superconductor. A thermodynamical treatment is given, similar to that used for the elucidation of ferromagnetism. Theoretically, the magnetic moment of the saturated layer is found to be proportional to  $\sqrt{\theta - T}$  while Leiden experiments shows a linear dependence on  $\theta - T$ , where  $\theta$  is the critical absolute temperature and  $T$  any absolute temperature used. H. M. B.

ASAC 51.4 METEOROLOGICAL LITERATURE CLASSIFICATION

SA

4587. Second Law of Thermodynamics and the Relations between Parts of the World-System. M. Bronstein and L. Landau. *Phys. Zeits. d. Sowjetunion*, 4, 1, pp. 114-119, 1933. In German.—A discussion of the irreversibility of thermodynamic phenomena. This irreversibility and in general the physical difference between the two directions (past and future) can only be explained from the circumstance that regions exist in the world which do not obey the theories (classical or wave-mechanical) which lead to thermodynamics. T. 11.

ASB-51A METALLURGICAL LITERATURE CLASSIFICATION

<p>835. Possible Explanation of the Dependence on the Field of the Susceptibility at Low Temperatures. L. Landau. <i>Phys. Zeits. d. Sowjetunion</i>, 4. 6. pp. 670-679, 1931. --The chlorides of Cr, divalent Fe, Co and Ni possess the peculiarity that at ordinary temperatures their magnetic susceptibility strongly increases with falling temperature, but at low temperatures they show no ferro-magnetism but only a dependence of the susceptibility on the field. The author suggests an explanation of this anomaly deduced theoretically and in agreement with the known facts. Since the named elements can form both ferro- and paramagnetic compounds it may be concluded that the reciprocal force of orientation of the spin can be positive as well as negative dependent probably chiefly on the distance between the atoms. The substances named form crystal lattices in which the paramagnetic atoms lie in layers in which the distance between the layers is actually greater than the distance between the atoms in the layer. If it is assumed that the forces of orientation within a layer are positive but those of different layers upon each other negative and besides actually smaller, the following picture is got. At low temperatures there are spontaneously magnetised layers whose magnetic moments are however orientated in reversed directions so that no spontaneous magnetisation of macroscopic extent exists and so no ferromagnetism. Since the reciprocal action of different layers is comparatively small a comparatively weak field suffices to change strongly the opposite orientation of the moments. Thus deviations from the linear law of the dependence of the total moment on the field are produced and finally saturation phenomena in which the magnetic field orientates the magnetic moments of all layers parallel to its direction. The quantitative theory of the phenomenon is discussed. J. S.</p>		<p>A 53 H</p>
<p>ASB-5L</p>	<p>ASB-5L</p>	<p>ASB-5L</p>

LANDAU, Lev Davidovich (Acad.)

"The Structure of the Undisplaced Scattered Line." Phys. Z. Sowjet. 5, 172  
(1934).

ca 3

THE PRODUCTION OF ELECTRONS AND POSITRONS BY A COLLISION OF TWO PARTICLES. L. LANDAU AND E. LIFSHITZ. *Physik. Z. Sowjetunion* 6, 244-257 (1934). -The particles are considered to be moving with the velocity of light. The cross section of the effect is obtained; it increases with the cube of the log of the energy of the colliding nuclei.

A. B. F. DUNCAN

ASH-SLA METALLURGICAL LITERATURE CLASSIFICATION

**M**

**23**

Landaу, L., and ——— Kompaneіt.. The Electrical Conductivity of Metals  
[In Russian.] Pp. 60. 1938. Kharkov: Gosn. nauch.-tekhn.  
izd-vo. (K. 45.)

A.S.B.-S.L.A METALLURGICAL LITERATURE CLASSIFICATION

E-Z

COMMON ELEMENTS										PROCESSES AND PROPERTIES INDEX										1ST AND 2ND COVER										3RD AND 4TH COVER									
M																																							
<p><b>Theory of Anomalous Specific Heats.</b> 1. Landau (<i>Physikal. Z. Sowjetunion</i>, 1935, 8, 113-118).—[In German.] Many solids are characterized by an increase of their specific heat with temperature up to a certain critical temperature, followed by a subsequent sudden decrease. A mathematical theory of this phenomenon is developed along lines based on the work of Dehlinger.—J. T.</p>																																							
<p>ASB. S. L. A. DETALLURGICAL LITERATURE CLASSIFICATION</p>																																							
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LANDAU, L.

11

\*The Theory of the Dispersion of Magnetic Permeability in Ferromagnetic Bodies. / L. Landau and E. Lifshitz (*Physikal. Z. Sowjetunion*, 1935, 8, 153-169).—[In English.] The distribution of magnetic moments in a ferromagnetic crystal is investigated mathematically. Such crystals are shown to consist of elementary layers magnetized to saturation; the width of the layers is determined. In an external magnetic field the boundaries between the layers move; the velocity of movement is determined. Expressions are derived for the magnetic permeability in periodic fields, respectively parallel and perpendicular to the axis of easiest magnetization.—L. S. G. T.

CO

THEORY OF ACCOMMODATION COEFFICIENT. I. Landau. *Physik. Z. Sowjetunion* 8, 489-500(1935).—Essentially the accommodation coeff. must be calc. on a purely classical basis. At not too high temp. this leads to a proportionality with  $T^{3/2}$ . A quantized limiting case appears with  $H_2$  and He at sufficiently low temp. which leads to a  $T^2$  law. H. H. Rowley

ABSTRACTS OF METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND CORDS										3RD AND 4TH CORDS									
PROCESSES AND PROPERTIES INDEX																			
<p><i>BC</i> <span style="float: right;"><i>a-1</i></span></p> <p>Theory of the photo-electromotive force in semiconductors. L. LANDAU and E. LIFSHITZ (Fizikal. Z. Sovetskoy, 1938, 9, 477-503).—The e.m.f. appearing in a circuit containing a semiconductor illuminated from one side is calc. for the two cases: (a) that conduction in the semiconductor is due to electrons, (b) that conduction is due to electrons and to holes behaving as positive electrons. O. D. S.</p>																			
<p>ASAC-SLA METALLURGICAL LITERATURE CLASSIFICATION</p>																			
<p>FROM SYMBOL</p>										<p>TO SYMBOL</p>									
<p>GROUPS</p>										<p>GROUPS</p>									

Ca

The theory of unimolecular reactions. L. Landau. *Physik. Z. Sowjetunion* 10, 67-77(1936).—At high pressures the decompn. velocity of large mols. is unimol.; at low pressures it is bimol. Between these two extremes there is an intermediate region where the order of reaction gradually goes over from the first to the second. Equations are derived that relate the reaction velocity under various conditions to the thermodynamic properties of gases.  
Marie Farnsworth

COMMON ELEMENTS

COMMON VARIABLES INDEX

OPEN

MATERIALS INDEX

ASB-SLA DETALLURGICAL LITERATURE CLASSIFICATION

1930-1939

1940-1949

1950-1959

1960-1969

1970-1979

1980-1989

1990-1999

2000-2009

2010-2019

2020-2029

2030-2039

2040-2049

2050-2059

2060-2069

2070-2079

2080-2089

2090-2099

2100-2109

2110-2119

2120-2129

2130-2139

2140-2149

2150-2159

2160-2169

2170-2179

2180-2189

2190-2199

2200-2209

2210-2219

2220-2229

2230-2239

2240-2249

2250-2259

2260-2269

2270-2279

2280-2289

2290-2299

2300-2309

2310-2319

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2330-2339

2340-2349

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2990-2999

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3010-3019

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3070-3079

3080-3089

3090-3099

3100-3109

3110-3119

3120-3129

3130-3139

3140-3149

3150-3159

3160-3169

3170-3179

3180-3189

3190-3199

3200-3209

3210-3219

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4620-4629

4630-4639

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LANDAU, L.

COMMON ELEMENTS

MATERIALS INDEX

AS N-SLA METALLURGICAL LITERATURE CLASSIFICATION

E-Z

ALPHABETICAL INDEX

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 \*On the Properties of Metals at Very Low Temperatures. L. Landau and I. Pomerantschuk (*Physikal. Z. Sowjetunion*, 1935, 10, (5), 649-665).—[In German.] Taking into account inter-electronic forces, an expression is derived for the resistance of metals as a function of the temperature. The resulting formula can be written  $R = \alpha T^2 + \beta T^5$ . The term  $\alpha T^2$  is that attributable to inter-electronic action. This formula agrees well with experimental values of the resistance of platinum at temperatures down to 20° abs. An expression is derived for the thermoelectric power at a junction at low temperatures; the expression satisfies the Thomson-Onsager relations.—J. S. G. T.

18

3

Quantum properties of liquids. I. D. Landau. *Bull. Acad. sci. U. R. S. S., Classe sci. math. nat., Ser. phys.* 1937, No. 3, 379 (in German 379-401).— A brief discussion of the quantum properties of liquid He and of the differences in the quantum properties of various isotopes of a given element in the liquid state. S. L. Madorsky.

Theory of electron streaming in multiple-grid tubes. W. Schottky. *Ann. Physik* 32, 195-204 (1938).— Math. S. L. Gerhard

ASH S.E.A. METALLURGICAL LITERATURE CLASSIFICATION

**Theory of phase changes.** I. L. Landau. *Physik. Z. Supplementen* 11, 26-47 (in German); *Z. Exptl. Theoret. Phys.* (U. S. S. R.), 7, 10-22 (1937). Continuous phase changes, i. e., changes without latent heat, are investigated from a thermodynamic point of view. It is found that such transitions may occur with a change of lattice symmetry, and the following 2 types of change are possible: (1) Curie points with a discontinuity in the sp. heat, which are situated on a curve in the  $p, T$  diagram; (2) isolated points in the  $p, T$  diagram which lie on the intersections of the ordinary phase-change curves in a certain way. Math. Helen S. Hopfield

Urie S. Hopfield

ASME 33.2 METALLURGICAL LITERATURE CLASSIFICATION

ca

9

Kinetic equation in the case of a Coulomb interaction.  
 1. Landau. *J. Exptl. Theoret. Phys.* (U. S. S. R.) 7,  
 203 9 (1937). — A kinetic equation for systems of charged  
 particles with correction for interaction is derived, the  
 order of the free path is calcd. and the rate of equalization  
 of the temp. of ions and electrons in the plasma is detd.  
 P. H. Rathmann

COMMON ELEMENTS

COMMON VARIABLES

OPEN MATERIALS INDEX

ASB-SEA METALLURGICAL LITERATURE CLASSIFICATION

RECORDING

REVISION

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1ST AND 2ND ORDERS																										3RD AND 4TH ORDERS																									
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<p>Dispersion of x-rays by crystals with alternating structure. I. I. Landau. <i>J. Exptl. Theoret. Phys.</i> (U. S. S. R.) 7, 1226-31 (1937).—A formula is derived for the x-ray line intensity distribution and the form of the spots on dispersion from crystals with alternating layers both by the Laue and by the crystal-rotation methods.</p> <p style="text-align: right;">b. H. Rathmann</p>																																																			
<p>ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION</p> <p>VISION: 174.881.01</p> <p>VISION: 174.881.01</p> <p>VISION: 174.881.01</p>																																																			
<p>VISION: 174.881.01</p> <p>VISION: 174.881.01</p> <p>VISION: 174.881.01</p>																																																			

13C

66-1

ABSORPTION OF SOUND IN SOLID BODIES, I.  
 LANDAU and G. RUMER (Physikal. Z. Sovietunion, 1937, 11, 18-25).—Mathematical. The absorption of short sound waves is treated as the result of collisions between sound quanta and Debye's heat quanta. A linear variation of the absorption coeff. with frequency is deduced. O. D. S.

ASAC-SLA METALLURGICAL LITERATURE CLASSIFICATION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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1ST AND 2ND ORDERS																										3RD AND 4TH ORDERS																									
COMMON ELEMENTS																										PROCESSES AND PROPERTIES INDEX																									
<p><i>ca</i></p> <p>The theory of phase transformation. H. L. Landau. ...  <i>Physik. Z. Sowjetunion</i> 11, 545-55(1937) (in German).—            No crystal can exist whose d. depends only on one or on two            coordinates. In liquid crystals the mol. centers are ar-            ranged haphazardly, but all the mols. are oriented in the            same manner. There can be no Curie point in the m. p.-            pressure curve.            S. Bradford Stone</p>																										2																									
METALLURGICAL LITERATURE CLASSIFICATION																										E2																									

BC L-1

Statistical theory of the nucleus. L. LANDAU  
(Physikal. Z. Sovietunion, 1937, 11, 556-565).  
Formulae for the energy distribution of nuclear levels  
can be obtained without assuming the nucleus to be  
an ideal gas (cf. A., 1936, 1175). A formula for the  
determination of the width of resonance levels for  
neutrons is given. The inelastic scattering of neutrons  
is also discussed. A. J. M.

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

COMMON ELEMENTS

OPEN

MATERIALS INDEX

ASTM-SSA METALLURGICAL LITERATURE CLASSIFICATION

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SA

925. X-Ray Scattering by Crystals with Variable Lamellar Structure. L. Landau. *Phys. Zeits. d. Sowjetunion*, 12, 5, pp. 579-585, 1957. In English. A formula is derived for the distribution of intensities in X-ray lines on scattering from crystals with variable lamellar structure. The shape of the spots in a Laue diagram and of the lines in a rotational pattern are examined.

AUTHOR.

AS-55A METALLURGICAL LITERATURE CLASSIFICATION

454

50

452

1520. Origin of Stellar Energy. L. Landau. *Comptes Rendus (Doklady) de l'Acad. des Sciences, U.S.S.R.* 17. 6: pp. 305-306, 1937. In English. — Despite the strongly endothermic nature of neutron formation from electrons and nuclei a body composed of matter in the neutronic state can become stable when its mass is large enough; this is a consequence of the loss in internal energy in changing from the electronic to the neutronic state being compensated by the gain in gravitational energy. The state being compensated at which the neutronic state becomes more "critical" mass of a body at which the neutronic state becomes more stable than the electronic state is calculated as of the order of  $10^{30}$  gm. The change of matter from the electronic to the neutronic state is suggested as the probable source of stellar energy. During the sun's probable time of radiation of  $2 \times 10^9$  years the amount of energy radiated is  $3 \times 10^{46}$  ergs and this quantity could be provided by the transition of only 2% of the solar mass into the neutronic state. In accordance with these conceptions a star is regarded as a body with a neutronic core the steady growth of which liberates the energy necessary to maintain the star at its high temperature. J. E. K.

**J. E. K.**

AS 4.3 LA METALLURGICAL LITERATURE CLASSIFICATION

התאחדות המורים

LANDAU, Lev Davidovich (Acad.)

"The Cascade Theory of Electronic Showers." Proc. Roy. Soc. A166, 213 (1938)

LANDAU, L. and Ye. Lifshits

"Field Theory," (Teoriya Polya), Gostekhizdat, 1940, 171 pp.

W-16125

LANDAU, Lev Davidovich, 1903-

LANDAU, Lev Davidovich: Mechanics. Moskva, Gos. izd-vo tekhn.-teoret. lit-ry, 1940.  
200 p. (Teoreticheskaya fizika, t. 1)

LANDAU, Lev Davidovich, 1908-

Statistical physics. Izd. 2-e, perer. Moskva, Gos. izd-vo tekhn.-teoretich. lit., 1940.  
223 p. (Teoreticheskaya fizika, t. 2.)

OC

Angular distribution of shower particles. L. Landau (U.S.S.R., 1940, 8, 237-242).—The total no. of all particles in a shower is given by an exponential factor previously calc. (A., 1938, 1, 424) and a non-exponential factor. The latter is calc., and an expression is obtained for the max. no. of particles in a shower. An expression for the angular distribution of particles in a shower at a given level is obtained. The mean horizontal width of a shower at a given level is obtained. The width is almost independent of the path traversed by the shower and of the kind of particle generating it. In air the width is  $\sim 280$  m. A. J. M.

INST. FOR PHYS. PROB.  
AS USSR C 1940-

DETAILLURICAL LITERATURE CLASSIFICATION

**C A**

The "radius" of the elementary particles. I. Landau.  
Phys. Rev. 58, 1940-7; J. Exptl. Theoret. Phys.  
(U. S. S. R.) 10, 718-20(1940). - Theoretical.  
G. M. Petty

**ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION**

ISSN: 0013-788X  
CODEN: ASLADJ

1960-1969  
1970-1979  
1980-1989  
1990-1999  
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2010-2019  
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CA

Scattering of mesotrons by nuclear forces. 1. Landau  
✓ *Exptl. Theoret. Phys.* (U. S. S. R.) 10, 721 2(1940)  
J. *Physics* (U. S. S. R.) 2, 483-4(1940).-- Theoretical  
o math. A correct formula for effective cross section of the  
mesotrons is obtained for cases in which the perturbation  
theory is not applicable. F. H. Rathmann

ASB-S2A METALLURGICAL LITERATURE CLASSIFICATION

FROM STAINLESS

SECOND HALF ONLY ONE

REVISIONS

FROM SOMETH

REVISION ONE ONLY 151

GROUP

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Angular distribution of particles in showers 1.  
Landau, J. *Exptl. Theoret. Phys.* (U. S. S. R.) 10,  
1007 12(1940).--Theoretical-math. Various equations  
are derived for the no. of charged particles and their  
angular distribution in a shower. F. H. Rathmann

LANDAU, L.

"On the Polarization of Electrons by Scattering," Dok. AN, 26, No. 5, 1940

Inst. for Physical Problems; Acad. of Sci. Moscow, c1940-.

LANDAU, Lev Davidovich, 1908-

Electromagnetic field theory. Moskva, Gos, izd-vo tekhniko-teoret. lit-ry, 1941.  
283. p. (Their: Teoreticheskaya fizika, t. 4 i.e. 2) (50-52232)

QC670.L3 1941

1ST AND 2ND ORDERS																										3RD AND 4TH ORDERS																									
COMMON ELEMENTS																										PROCESSES AND PROPERTIES INDEX																									
<p><i>M</i></p> <p><b>SUPRACONDUCTIVITY. L. LANDAU (U.S.S.R.), 1941, 4,(4) 380)--</b>  <b>(In English) Brief abstract of a paper presented at a conference on</b>  <b>Low</b></p> <p>Temperature Physics, Moscow, 1941. A survey. Pomeranchuk has pointed out that if between the ground and the excited levels in a superconductor there is a gap, then, in particular, at temp. considerably below the transition point the superconductor must behave as an insulator in relation to its heat conductivity (as the phonons cannot transfer their energy to the electrons under these conditions). This also refers to the absorption of elastic vibrations and, in particular, of the torsional vibrations in a superconductor. —AUTHOR.</p>																																																			
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[illegible]

LANDAU, L.

CA

Contribution to the theory of secondary showers. L. Landau. *J. Exptl. Theoret. Phys.* (U. S. S. R.) 11, 32-4; *J. Phys.* (U. S. S. R.) 4, 375-6 (1941) (in English). Theoretical. The no. of showers produced by mesotrons with  $> n$  charged particles is given by  $N \propto \sqrt{1/n} = \sqrt{nL}$ , where  $L$  varies from 33 for air to 22 for lead. The max. of the Rossi shower curve is given by  $N_{max}/N_1 = \bar{Z}_1/Z_1$  where  $Z$  = av. at. no. F. H. Rathmann

Inst. Phys. Prob.  
AS SSSR, MOSCOW, -1940-

1ST AND 2ND COLUMNS		3RD AND 4TH COLUMNS	
<p>CA</p> <p>Scattering of light by mesotrons. L. Landau and Ya. Smorodinskii. <i>J. Exptl. Theoret. Phys.</i> (U. S. S. R.) 11, 35-42 (1941); <i>J. Phys.</i> (U. S. S. R.) 4, 455 (1941).--            Math. The cross section of mesotrons increases with increase of the energy involved in the process because the mesotron, contrary to the electron, cannot be treated as a math. point even in a fixed-coordinate system. Landau (<i>C. A.</i> 35, 667) gave a criterion which permits an estimate of the cross section of the mesotron even for the highest energies. This criterion is used to evaluate the cross section for (1) the Compton effect on the mesotron, (2) the formation of mesotron pairs in collision of two photons, (3) the scattering of a mesotron in a coulombic field, cross sections remaining finite even for the highest energies. It follows from these calculations that the scattering of mesotrons by the coulombic field of protons is negligible when compared with the scattering by electrons. M. Afsar</p>		<p>3</p>	
<p>INST. PHYS. PROB,            A S SSSR, MOSCOW, - 1940-</p>			
<p>ASR-51A METALLURGICAL LITERATURE CLASSIFICATION</p>			
<p>FROM SYMBOLIC</p>		<p>TO SYMBOLIC</p>	
<p>FROM MAP ONLY ONE</p>		<p>TO MAP ONLY ONE</p>	
<p>FROM MAP ONLY ONE</p>		<p>TO MAP ONLY ONE</p>	

1ST AND 2ND ORDERS																										3RD AND 4TH ORDERS																									
PROCESS AND PROPERTIES INDEX																																																			
<p>CA</p> <p style="text-align: right;">2</p> <p>Theory of the stability of strongly charged lyophobic sols and of the adhesion of strongly charged particles in solutions of electrolytes. II. Derjagin and L. Landau, <i>Acta Physicochim. U. R. S. S. 14</i>, 621-63 (1941) (in English). Theoretical study. The elec. interactions between strongly charged plane and convex surfaces are calculated for spheres immersed in an electrolyte. Contrary to the findings of some earlier authors, the interaction is always one of repulsion. Combination with van der Waals attractive forces leads to force or energy curves with 1 or 2 minima sep'd. by a max. The height of the max. det's. the stability of the electrolytic sol or of the sol or suspension, resp. The stability criterion essentially substantiates W. Ostwald's rule, but is more exact. F. H. Rathmann</p> <p>AS USSR INST. OF COLLOID-ELECTROCHEM. LAB OF THIN FILMS INST. OF PHYS. PROB.</p>																																																			
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<p><i>M</i></p> <p>ON the INTERMEDIATE STATE of Superconductors. L. D. Landau (<i>Izvest. Akad. Nauk S.S.S.R.</i>, 1942, [Fiz.], 6, (1/2), 70).—[In Russian.] A brief résumé of a paper including a theoretical consideration showing the possibility of an experimental confirmation of L.'s theory of an intermediate state of superconductors.—N. A.</p>																																																			
<p>ASB-5LA METALLURGICAL LITERATURE CLASSIFICATION</p>																																																			
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6.160

11. 20.1.1942

Dragging of a liquid by a moving plate. L. Landau and B. Levitsch (*Acta Physicochim. U.R.S.S.*, 1942, 17, 42-54).—Expressions derived for the thickness ( $h$ ) of the liquid layer carried along by a plate moving through the liquid take the forms: (1)  $h = A(\eta\gamma)^{1/2}(\rho g)^{1/2}$  for small vals. of  $v$ , the velocity of the plate, (2)  $h \sim A\eta\gamma/\rho g$  for large vals. of  $v$ , and (3)  $h = (\eta/\rho g)^{1/2}f(v\gamma/\eta)$  for intermediate vals., the last function, and the numerical const.  $A$ , having to be determined by experiment.  $\eta$ ,  $\gamma$ , and  $\rho$  are the viscosity, surface tension, and density of the liquid. J. H. BA.

AS USSR  
INST. FOR PHYS. PROB.  
INST. OF COLLOID CHEM. & ELECTROCHEMISTRY

LANDAU, L.

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PROCESSES AND PROPERTIES INDEX																			
<p>On the Theory of the Intermediate State of Superconductors, L. Landau  <i>(J. Physics (U.S.S.R.), 1943, 7, (3), 99-107).—[In English.] Theoretical.</i>                      The body of a superconductor in the intermediate state consists of regions,                      each of which is either in the superconducting or the normal state, and the                      shape of these regions is important. In the model discussed, the regions are                      considered as alternately superconducting and normal laminae, which, on                      approaching the surface of the specimen, branch an unlimited number of                      times. The thickness of each lamina, therefore, tends to zero as the surface                      is approached. On the basis of this model, the behaviour of a superconductor                      with a transversal slit in a magnetic field, and the hysteresis effect in the                      transition to the intermediate state, are theoretically discussed.—G. V. R.</p>																			

Relation between liquid and gaseous states of metals. I. Landau and J. Zeldovitch (*Acta Physicochim. U.R.S.S.*, 1943, 18, 101-196). - The existence of a continuous spectrum of electron energy levels is necessary but not sufficient for the metallic state; to ensure conductivity it must be possible for charge to be transferred between the fundamental state and adjacent excited levels. In dielectrics there is a finite gap at all temp. between such levels, continuous transition to metallic conduction being impossible except at  $\sim 10^4$  K. Three cases are distinguished for metal-gas transition: (i) a single crit. point at very high temp., (ii) a liquid-gas crit. point at a temp.  $\ll$  that of the crit. metal-dielectric point (e.g., Hg), with the co-existence of two metallic and one dielectric phases, or (iii) one metallic and two dielectric (liquid and gaseous) phases. For Hg there are predicted a non-conducting liquid phase and a phase transition above the normal crit. point with a discontinuous change of electrical conductivity, sp. vol., and other properties. I. J. J.

ACAD. Sci. USSR.  
INST. FOR. Phy. PROBLEMS  
INST. Chem-Phy., c 1943-

LANDAU, L.

"The Mechanics of Continuous Media," (Mekhanika Sploshnykh Sred), by L. Landau and Ye. Lifshits, Gostekhizdat (1944), 407 pp.

W-16125

[illegible]

*[Handwritten mark: "LY"]*

**Theory of scattering of protons by protons.** I. Landau and Ya. Smorodinskii. *J. Phys. (U. S. S. R.)* 8, 151-62 (1944) (in English); *J. Exptl. Theoret. Phys. (U. S. S. R.)* 14, 260-78 (1944). - Theoretical. A formula is derived without any assumption as to the actual shape of the potential-energy curve between two protons. Analysis of exptl. data from the literature shows that the system of proton-proton possesses no stable level. By a method similar to that of Heine and Piers (cf. C. A. 30, 4752), and without recourse to the method of rectangular wells, the forces between proton and neutron are shown to be approx. equal. - E. H. R.

**INST. FOR PHYS. PROB  
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ASM-SEA METALLURGICAL LITERATURE CLASSIFICATION

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PHYSICS

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<div style="display: flex; justify-content: space-between;"> <span>ST</span> <span>453</span> </div> <div style="text-align: center;"> <p>530.14 <span style="float: right;">23</span></p> <p>On the energy loss of fast particles by ionization.</p> <p>LANDAU, L. <i>J. Phys., USSR</i>, 8 (No. 4) 201-5 (1944).—</p> <p>Let <math>f(x, \Delta)</math> be the probability that a particle of given energy will lose an amount of energy lying between <math>\Delta</math> and <math>\Delta + d\Delta</math>, on traversing a layer <math>x</math> of material. Let <math>w(e)</math> be the probability of an energy loss <math>e</math>. The function <math>f</math> satisfies the equation</p> <math display="block">\partial f / \partial x = \int_0^\infty w(e) (f(x, \Delta - e) - f(x, \Delta)) de</math> <p>This is solved by a Laplace transformation, and <math>f</math> is expressed explicitly in terms of a certain integral function whose properties (e.g. asymptotic expansion) are investigated. <span style="float: right;">L. R. G.</span></p> </div> <div style="margin-top: 20px;"> <p>INST. FOR Phys. PROP</p> <p>AS USSR 1944-.</p> </div>																																																			
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1ST AND 2ND CODES										3RD AND 4TH CODES									
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<p>Relation between the liquid and the gaseous states in metals. Ya. B. Zel'dovich and L. Landau. <i>J. Exptl. Theoret. Phys.</i> (U. S. S. R.) 14, Nos. 1-2, 33-4 (1944). — Theoretical. General considerations as to the nature of the transition of a substance from the metallic to the dielec. state lead to the conclusion that such a transition takes place like an ordinary phase-transition up to very high temps. In the case of Hg and other low-boiling metals the crit. b. p. for the liquid-gas transition is probably lower. One may therefore expect the existence of 2 distinct transitions from the metallic to the nonmetallic state and from the liquid to the gaseous state, i. e., of a liquid nonmetallic phase passing over into the metal at higher pressures and into the gas at lower pressures. F. H. Rathmann</p>																			
<p>INST. Phys. Problems. ACAD. Sci. -1943- INST. Chem-Physics</p>																			
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LANDAU, L,

"On the Hydrodynamics of Helium II," Zhur. Eksper. i Teoret. Fiz., 14, No. 3-4,  
1944.

Inst. Physical Problems, Acad.Sci., -1944-.

LANDAU, L.

"A Contribution to the Theory of Slow Combustion," Zhur. Eksper. i Teoret. Fiz., 14,  
No. 6, 1944.

Inst. Physical Problems, Acad. Sci., -1944-.

*Br. Abw*

Theory of slow combustion. L. Landau (Acta Physicochim., 1944, 19, 77-85). - The transference of heat from burning products of combustion to unburnt, as is usually assumed to be by simple thermal conduction. The stability of such a system is considered, and it is shown that the above assumption is not justified, as convection also plays a dominating part. The combustion of liquids is also considered. A.J.M.

A-S USSR  
INST. FOR Phys. Prob.

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A-1

New exact solution of Navier-Stokes equations. L. Landau (Compt. rend. Acad. Sci. U.R.S.S., 1944, 43, 286-289).—The motion in an axially-symmetrical jet spreading in an unbounded space can be determined accurately for arbitrary Reynolds nos. by a rigorous solution of the Navier-Stokes equations. Limiting cases for weak and strong jets are considered. L. J. J.

INST. Phys. Problems  
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ASTM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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*LANDAU, L. D.*  
LANDAU, L.

K probleme turbulentnosti. (Akademiia Nauk SSSR. Doklady. Novaia seriia, 1944, v. 44, no. 8, p. 339-342)

Title tr.: On the problem of turbulence.

Also published in English in Comptes rendus de l'Academie des Sciences de l'URSS. Nouvelle serie, 1944, v. 44, no. 8, p. 311-314. (Q60.A52).

AS262.S3663 v. 44

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955

LANDAU, L.

"Stability of Tangential Discontinuities in Compressible Fluid," Dok. An, 44, No. 4, 1944

"On the Problem of Turbulence, " Dok. An, 44, No. 8, 1944

Inst. Phys. Problems; Acad. Sci., c1944

LANDAU, L. D.

Landau, L. D. Impact waves far from their source. Appl. Math. Mech. [Akad. Nauk SSSR. Prikl. Mat. Mech.] 9, 286-292 (1945). (Russian. English summary) [MF 15339]

This note deals with shock-waves due to a body which moves with a steady supersonic speed. At large distances from the body the shock-waves may be considered to be sonic disturbances such that the cubes of the amplitudes may be neglected. Introducing a new independent variable  $\tau = x(U^2 - c_0^2)^{-1/2}$ , the author reduces the problem to the equation of spherical waves,  $\tau$  being the time-coordinate; here  $x$  is the coordinate in the direction of the motion of the body,  $U$  the speed of the body and  $c_0$  the speed of sound at a stagnation point. A small portion of the wave may be considered as a plane wave whose amplitude decreases as  $r^{-1}$ ,  $r$  being the distance from the  $x$ -axis. The author concludes that there will be two shock waves following the body and that the intensity of the shock is proportional to  $r^{-1}$ . The same method is applied to a brief discussion of spherical shock-waves due to an explosion. The presentation is rather sketchy and the reviewer was unable to follow all details.

L. Bers (Syracuse, N. Y.)

Source: Mathematical Reviews,

Vol 8, No. 2

LANDAU, L.

"On Shock Waves at Large Distances From the Place of Their Origin."  
Zhur. Phys., 496, No. 6, Vol. IX, 1945

Inst. for Phys. Problems of the Acad. of Sci. of the USSR. c1945-.

LANDAU, L.

"Theory of Stability of Highly Charged Lyophobic Sols and Adhesion of Highly  
Charged Particles in Solutions of Electrolytes\*," Zhur. Eksper. i Teoret. Fiz., 15,  
No. 11, 1945.  
Inst. Colloid- and Electrochem. and Inst. Physical Problems, Acad. Sci. USSR, -1945-.

1ST AND 2ND COPIES										3RD AND 4TH COPIES									
PROCESSES AND PROPERTIES INDEX																			
<p><i>ca</i></p> <p>The detonation of condensed explosives. L. D. Landau and K. P. Stanyukovich. <i>Compt. rend. acad. sci. U.R.S.S.</i> 46, 862-4 (1945); <i>Doklady Akad. Nauk.</i></p> <p>S.S.S.R. 46, 300-R (1945); cf. C.A. 40, 42171.—The authors show that numerous so far unsolvable discrepancies arise from the application of the equation of state which forms the basis of the modern theory of detonation of condensed explosives and assert that the density of the decomposed explosive is sufficiently high as to make application of the gas law impracticable. They suggest comparing the detonation decomposition products with a liquid whose particles are in a state of oscillation; this conditions the course of expansion of the decomposed products. From carefully detd. exptl. data it is found that for a no. of local action explosives (e.g., ten, tetryl, picric acid, trinitrotoluene) the dependence of the detonation velocity <math>D</math> on density of explosive <math>\rho_0</math> is given by the relation <math>D = 11N</math> for values of <math>N</math> ranging from 0.8 to 1.8; graphs of this function are presented. Use of three fundamental equations of the hydrodynamic theory of detonation leads to the equation <math>p = p_0 + (AT/v)</math>, where <math>p</math> is the pressure, <math>p_0</math> the part of the pressure independent of temperature, <math>A</math> a coefficient depending on the no. of degrees of molecular freedom, <math>T</math> the temperature, and <math>v</math> the volume. Then, by a series of approximations, whereby the work of expansion of the detonation products is derived for a change in their vol. from <math>v_0</math> to <math>v</math>, the relation <math>p_0 v_0 / (v - 1) = Q - (D^2/2(n^2 - 1))</math> is derived, wherein <math>Q</math> is the heat of reaction, and <math>n</math> is the exponent of the assumed equation <math>p v^n = \text{constant}</math>. Interesting parameters computed for the local action explosives listed above include <math>Q</math>, <math>D</math>, <math>\rho_0</math>, <math>n</math>, <math>T</math>, etc.</p>										<p>24</p> <p>ENG. COMMITTEE RED ARMY; INST. Phys. Prob. AS, C 944-</p>									
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<p>Determination of the flow velocity of the detonation products of some gaseous mixtures. L. D. Landau and K. P. Stanyukovich (Inst. of Phys. Problems, Acad. of Sci., U.S.S.R.) (Eng. Comm. of the Red Army). <i>Compt. rend. acad. sci. U.R.S.S.</i> 47, No. 3, 199-201; <i>Doklady Akad. Nauk S.S.S.R.</i> 47, No. 3, 205-7 (1945).—Formulas are developed for the velocity of particles both with and without correction for change in specific heats with temp. The results of computations are summarized for gaseous mixts. of 2 moles of H<sub>2</sub>, one of O<sub>2</sub>, and 0, 1, 3, 5 moles of N<sub>2</sub>. Determination of the flow velocity of the detonation products of condensed explosives. <i>Compt. rend. acad. sci. U.R.S.S.</i> 47, No. 4, 271-4; <i>Doklady Akad. Nauk S.S.S.R.</i> 47, No. 4, 273-6 (1945); cf. above abstr.—The flow velocity of the detonation products is developed from the Riemann soln. of the hydrodynamics equation, disregarding dependence of sp. heats on temp. The results are given for computations on trotyl, picric acid, and tetryl.</p>																			
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LANDAU, L.D.

"Intratomic Energy" Komsol'skaya Pravda, April 25, 1946

Soviet Source: P: Smena, Moscow, May 46

Abstracted in USAF "Treasure Island" Report No. 64917, on file in Library of Congress,  
Air Information Division.

LANDAU, L.

SA

537.525.92

353

On the vibrations of the electronic plasma. LANDAU, L. *J. Phys., USSR*, 10 (No. 1) 25-34 (1946).—

The vibrations of the electronic plasma are considered, which arise as a result of an arbitrary initial non-equilibrium distribution in it. The vibrations are always damped, and the dependence of the frequency and of the decrement on the wave vector is determined for small and for large values of the latter. The penetration of a periodical external electric field into the plasma is considered. The case of the frequency of the external field being almost at resonance with the natural frequency of the plasma is considered separately.

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AS USSR c1945-

PA 54T80

LANDAU, L.

USSR/Physics  
luminescence  
Thermodynamics

Nov/Dec 1946

"The Thermodynamics of Photoluminescence," L. Landau,  
Inst Phys Prob, Acad Sci USSR, 4 pp

"Journal of Physics USSR" Vol X, No 6

Derivation of conditions imposed by thermodynamics  
upon total energy yield of photoluminescence and in-  
tensity of radiation in the anti-Stokes region. Re-  
ceived, 20 Jul 1946.

54T80

*L. Landau, L.*

Ginsburg, V., Landau, L., Leontovitch, M., and Fock, V.  
On the failure of A. A. Vlasov's papers on generalized  
theory of plasma and theory of solid state. Akad. Nauk  
SSSR. Zhurnal Eksper. Teoret. Fiz. 16, 246-252 (1946).  
(Russian. English summary)

The authors criticize Vlasov's papers in Bull. Acad. Sci.  
URSS. Ser. Phys. [Izvestia Akad. Nauk SSSR] 8, 248-266  
(1944); Acad. Sci. URSS. J. Phys. 9, 25-40, 130-138 (1945);  
Uchenye Zapiski Moskov. Gos. Univ. Fizika 77, 3-29, 30-42  
(1945); these Rev. 6, 222; 7, 104, 183.

*St. Jones*  
*1-4846*

*WSS*

Source: Mathematical Reviews,

Vol 8 No. 9

LANDAU, L. D.

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OSCILLATIONS OF AN ELECTRON PLASMA L. Landau

Translated from Zhur. Ekspri. i Teoret. Fiz. 16, 574-59 (1948). 18p.

The oscillograms of an electron plasma arising as a result of an arbitrary initial non-equilibrium distribution are considered. It is shown that the oscillations of the field in the plasma are always damped; the relation between the frequency, the attenuation factor and the propagation vector are determined for both large and small values of this vector. The penetration of an external periodic electric field into the plasma is analyzed. The behavior of the field well within the plasma is examined. The case in which the frequency of the external field is close to resonance with the natural plasma frequency is considered separately. (auth)

Inst. Physical Problems, Acad. Sci. USSR

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1ST AND 2ND CAPS										3RD AND 4TH CAPS									
PROCESSES AND PROPERTIES INDEX																			
Common Elements										Common Variable Moles									
<p>BA</p> <p>2</p> <p>Theory of superfluidity of helium II. L. Landau. <i>J. Phys. (U.S.S.R.)</i> 11, 91-3 (1947); cf. <i>C.A.</i> 41, 1510 (1947). The measurement of the "second sound" velocity in He II (<i>C.A.</i> 41, 2021) corroborates qualitatively the theoretical predictions (L. Landau, <i>J. Phys. (U.S.S.R.)</i> 5, 71 (1941)) insofar as the general theory is concerned. There is, however, a discrepancy stemming from the detailed interpretation of the theory which is being tentatively accounted for by assuming a new expression for the dependence of the energy of the elementary excitations on the momentum. The expression contains three constants that are adjusted to fit the expts. The division of energy spectrum into qualitatively different types of elementary excitations like phonons and rotons is abandoned.</p> <p>I. Tiers</p> <p>Inst. Phys. Problems, AS USSR</p>																			
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the periodic system of the elements in modern physics.  
L. D. Landau. *Vestnik Akad. Nauk S.S.S.R.* 17, 3-8  
(1947); *Chim. Zentr.* 1948, I, 545.—The periodic system  
is explained on the basis of quantum mechanics.  
M. G. Moore

LANDAU, Lev Davidovich, 1908-

LANDAU, Lev Davidovich: The theory of the electromagnetic field. Izd. 2., perer.  
Moskva, Gos. izd-vo tekhn.-teoret. lit-ry, 1948. 364 p. (Teoreticheskaia fizika,  
t. 4) (50-27514)

QC670.L3 1948

LANDAU, L. (1)

\*Landau, L., and Lifshic, E. Kvantovaya Mekhanika. Chisl. L. Nerelevativistskaya Teoriya. [Quantum Mechanics. Part I. Nonrelativistic Theory.] OGIZ, Moscow-Leningrad, 1948. 567 pp.

This book is more nearly a definitive text than an introductory one. Its rather extensive length is devoted strictly to the nonrelativistic theory, so that even spin-orbit coupling is treated only schematically and without presenting the exact form of the operator. The authors have not used the space at their disposal for detailed belaboring of elementary points, mathematical or experimental; their presentation is usually quite adequately clear for readers of suitable background, but is never prolix. They are thus able to cover rather thoroughly all of the main methods and applications of nonrelativistic quantum mechanics, with the single exception of the theory of solids. This is represented only by a half-dozen pages on Bloch's theorem regarding the motion of electrons in periodic fields.

Subjects treated with unusual thoroughness are the quasi-classical case (phase-integral methods), the theory of collisions, and, in particular, the applications of group theory to the discussion of polyatomic molecules. Also, in other parts of the book, there is generally to be found material not usually incorporated in textbooks; for example, in the chapter on spin there is an account of nonrelativistic (three-dimensional) spinors and a proof of Kramer's theorem on degeneracy in electric fields. Only in questions of basic principle, for example, the theory of measurement, is the treatment likely to be less thorough and adequate.

There does not seem to exist in English a book providing the particular values which this one provides for Russian students.

W. H. Furry (Cambridge, Mass.)

Source: Mathematics 1

LANDAU, L. D.

"Concerning the moment of a system of two photons," Reports of the AS USSR, Vol. 2, 1948.

LANDAU, L. D. KHALATNIKOV, I. M.  
25364

K Teorii Vyazkosti Geliya 11. [Doklad Na Sessii Otd-Niya Fiz-Matem.  
Nauk An SSSR 20 Fevr. 1948 G.] Izvestiya Akad. Naul SSSR, Seriya Fiz.,  
1948, No 3, s 216

SO: LETOPIS NO. 30, 1948

3944. Theory of viscosity of liquid helium II. LANDAU, L. D. AND KHALATNIKOV, I. M. *Bull. Acad. Sci., USSR, Ser. Phys.*, 12 (No. 3) 216 (1948). *In Russian*.—The viscosity of liquid helium II is considered (on the basis of Landau's theory) as consisting of a roton and a phonon part. The former depends mainly on elastic scattering of rotons by rotons and is independent of temp., while the latter depends above 0.6°K mainly on scattering by rotons, giving a contribution  $\propto e^{A/T-1}$ , and below 0.6°K mainly on phonon-phonon scattering, giving a contribution  $\propto T^{-1}$  ( $kA$  is the energy gap between the lowest levels of phonons and rotons). These predictions are in good agreement with experimental results by Andronikashvili [Abstr. 3946 (1949)].

ca  
1951

**Effective mass of the polaron.** I. Landau and S. I. Pekar  
(Inst. Phys. Problems Acad. Sci. U.S.S.R., Moscow).  
*Zhur. Eksp. Teor. Fiz.* 18, 419-23 (1948).—Theoretical  
consideration of the conservative motion of the polaron,  
viewed as the carrier of the elec. current in ionic crystals,  
leads to an effective mass  $M = 6.8 \times 10^{-8} (m^2/\hbar^2) \omega_0^2 \epsilon_0 =$   
 $9.08 \times 10^3 (\mu/m)^2 \epsilon_0$  g., with  $\epsilon_0 = (1/\omega^2) - (1/s)$ ,  $\epsilon_0 =$   
 $\epsilon_0/\omega_0^2$ , where  $s$  = dielec. const. at frequency 0,  $\omega_0$  = limiting  
frequency of the optical oscillations of the ions;  $m$  = mass  
of the free electron,  $\mu$  = its effective mass in the old conduc-  
tion zone. Ordinarily,  $M$  is much greater than the mass of  
the electron, e.g. in NaCl, 432X as great. The mobility  
of the polaron in an external field is given by  $\mu = 0.282 \times$   
 $10^{-11} e^2/b(\mu/m)^2 \epsilon_0^2$ , where the coeff.  $b$  is detd. experi-  
mentally by the absorption of electromagnetic waves in the  
crystal; specifically,  $b\omega_0$  is the imaginary part of the refrac-  
tive index for frequencies  $\omega \ll \omega_0$ . The dependence of  
the d. of the energy levels of the translational motion of a free  
polaron on its kinetic energy is of the same form as for a free  
particle of mass  $M$  and spin  $1/2$ . The thermodynamic equil.  
concn. of polarons is given by  $n = (2/\hbar^3) (2\pi M k T)^{3/2}$   
 $e^{(\xi - H_0/kT)}$ , where  $\xi$  = chem. potential of the electrons in  
the crystal, and the energy  $H_0 = -0.0547 (\mu e^2/\hbar^2) \epsilon_0^2$ . Inter-  
action between polarons and the thermal vibrations of the  
ions results in a Maxwellian distribution of the velocities of  
the polarons. V. Thou

COMMON ELEMENTS		COMMON SYMBOLS INDEX	
COMMON ELEMENTS		COMMON SYMBOLS INDEX	
<p>384. On the Theory of Energy Transfers During Collisions III (K Teorii Peredachi Energii pri Stokhnovleniyakh. III) by L. Landau and E. Lifshits Zhur Eksp. i Teoret. Fiz. 18 750-758 (1948) Aug (In Russian)</p>			
<p>An exact method is given for a calculation of the effective cross section of the splitting up of a deuteron when crossing the Coulomb field of a nucleus. In previous works (Landau, <u>Soviet Phys.</u> 1 88 (1932); Lifshits, <u>Zhur Eksp. i Teoret. Fiz.</u> 8 930 (1938)) the authors studied the different processes occurring at the collisions between deuterons and heavy nuclei, such as (d,pn), (d,p), (d,n), or a capture of the deuteron by the nucleus; however, the methods suggested showed only the trend of the cross-section curves, not the absolute values. The new method, as developed in the present article, is applied only to the case (d,pn); the results give the distribution of emitted particles according to their energies and angular dispersion. The mathematical exposition starts with the setting up a Schrodinger equation of the process under consideration, with the subsequent deduction of the dg formula; the latter includes an integral containing wave functions of the movement of a proton and a neutron in a Coulomb</p>			
<p>ASR-SLA METALLURGICAL LITERATURE CLASSIFICATION</p>			
<p>ASR-SLA METALLURGICAL LITERATURE CLASSIFICATION</p>			

field; this integral is evaluated, and the final cross section formula established. Since direct experimental data on the reaction studies are lacking, a comparison is made between the calculated cross sections for (d,pn) and the values given by Tatum and Cork (Phys Rev 71 p 159 (1947) for Bi<sup>209</sup> (d,p) Ra<sup>210</sup>, and Bi<sup>209</sup> (d,n) Po<sup>210</sup>, (the quantities measured were the activities of RaK and Po, thus leaving the reaction Bi<sup>209</sup> (d,pn) unaccounted):

E (MeV)	$\sigma_{d,p}$	$\sigma_{d,n}$	$\sigma_{d,np}$ ( $\times 10^{28} \text{ cm}^2$ )
8.2	18	3.4	170
6.3	1.5	0.12	10

This result suggests the predominance of the reaction (d,np).

LANDAU, L.

COMMON ELEMENTS

SERIALS INDEX

1608. On the Movement of Foreign Particles in Helium II, by L. Landau and I. Pomeranchuk. Doklady Akademii Nauk SSSR 59, p. 669-670, February 1, 1948. (In Russian)

J. Frank (Physical Review 70, p. 561, 1946) has suggested a method of enrichment of the isotope  $\text{He}^3$ , present in very small quantities in helium, on the theory that  $\text{He}^3$  can have no superfluid properties and cannot therefore share in the superfluid movements of helium II. Daut et al. (Physical Review 72, p. 502, 1947) have confirmed experimentally the possibilities of the method. The present author questions the theoretical explanation given by the previous writers and shows that any atoms, whether superfluid or not, when present in small quantities in He II, cannot accompany the latter in its superfluid movement.

MBR. Acad. Sci.

PA 62T94 .

LANDAU, L. D.

USSR/Nuclear Physics - Particles - Spin      Apr 1948  
Nuclear Physics - Photons - Moments

"Moments of a System of Two Photons," Academician L. D.  
Landau, Inst Phys Problems, Acad Sci USSR, 2 $\frac{1}{2}$  pp

"Dok Akad Nauk SSSR, Nova Ser" Vol IX, No 2

Discusses the question of the annihilation of slow  
positrons and electrons as postulated by Pomeranchuk,  
who stated that in the boundary cases fixed particles,  
having true two-photon annihilation, return to a zero  
state if the spin of the electron and positron is  
parallel. Explains the problem of whether or not this  
rule can also be applied to electromagnetic waves.  
Submitted, 5 Feb 1948.

62T94

LANDAU, L. D.

PA 11/49T96

USSR/Physics

Low Temperature Research

Jul 48

"The Theory of Superfluidity," Acad L. D. Landau,  
3 pp

"Dok Ak Nauk SSSR" Vol LXI, No 2

Landau's first article on subject appeared in 1941  
(Zhur Eksper i Teoret Fiz, 11, 592). Has been wide-  
ly discussed. Here he discusses L. Tisza's views on  
subject (Phys Rev 72, 838). Makes clear that he  
recognizes the undoubted merit of Tisza's work,  
but Landau feels many of criticisms unjustified.  
Submitted 15 Jun 48.

11/49T96

PA 51/49T62

USSR/Physics

Helium II  
Superfluidity

Jul 49

"Theory of Viscosity of Helium II: I, Collisions of Elementary Excitations in Helium II," L. D. Landau, I. M. Khalatnikov, Inst of Phys Problems, Acad Sci USSR, 14 pp

"Zhur Ekspier 1 Teoret Fiz" Vol XIX, No 7

Considers phenomenon of viscosity in helium II on the basis of theory of superfluidity of helium II. Calculated effective cross section of elementary excitations. Discusses dispersion of a phonon by excitations. 51/49T62

USSR/Physics

(Contd)

Jul 49

a phonon, dispersion of a phonon by a roton, and dispersion of a roton by a roton. Submitted 8 Apr 49.

51/49T62

LANDAU, L. D.

1ST AND 2ND SERIES										3RD AND 4TH (2000)									
PROCEDURES AND PROPERTIES INDEX																			
<p>N</p> <p>Nuclear Sci. Abs. V-7 Nov 30, 1953</p>										<p>914 Interaction Between the Electron and the Positron. V. B. Berestetskii and L. D. Landau. Zhur. Ekspil. Teoret. Fiz. 19, 873-9(1949) (in Russian).</p> <p>In classical electrodynamics a system of interacting charges can be described with an approximation up to, and including, members of the order <math>v^2/c^2</math>, (<math>v</math> is the velocity of the charge), with the aid of a Hamiltonian function depending on the coor- dinates and the momenta of the particles and including no radiation field. In quantum mechanics, the Hamiltonian of a system of electrons, with the approximation <math>v^2/c^2</math>, has been given by Breit (Phys. Rev. 34, 553(1929)). The present author derives the wave equation of the system electron-positron, with the above approximation, the main problem being the description of the exchange interaction between the two par- ticles.</p>									
										<p>8</p>									
<p>ASM-AIA METALLURGICAL LITERATURE CLASSIFICATION</p>																			
<p>1ST AND 2ND SERIES</p>										<p>3RD AND 4TH (2000)</p>									

CA

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Theory of superconductivity. V. L. Ginsburg and L. D. Landau (P. N. Lebedev Phys. Inst., Acad. Sci., U.S.S.R., Moscow). *Zh. Eksp. Teor. Fiz.* 20, 1004-82(1950).— In the theory of superconductive transition in the absence of a magnetic field, a parameter  $\psi$  is introduced, formally analogous to the spontaneous polarization in the theory of ferroelectricity and spontaneous magnetization in the theory of ferromagnetism. In analogy with the general behavior of the corresponding parameter in the theory of transitions of the 2nd kind, the  $\psi$ -function of "superconducting electrons" at thermodynamic equil. becomes zero above the crit. temp. and is different from zero below it. This "effective wave-function" is normalized in such a way that  $|\psi|^2$  represents the concn. of superconducting electrons. Equations are derived for the  $\psi$ -function and the vector potential, and are solved for the case of a superconducting half-space. The theory permits, in contrast to the existing phenomenological theory, expression of the surface tension at the boundary of the normal and superconducting phases in terms of the crit. magnetic field and the depth of penetration of the field into the superconductor. That depth depends on the field strength in strong fields, particularly in superconductors of small dimensions. In thin films, the magnetic perturbation of the supercond. is a transition of the 2nd kind, and becomes a transition of the 1st kind only above a certain crit. thickness. The external crit. magnetic field increases with decreasing thickness of the superconducting film, whereas the crit. elec. current decreases with the thickness. N. Thon

LANDAU, L.

Mathematical Reviews  
Vol. 15 No. 1  
Jan. 1954  
Mathematical Physics.

*капыс*  
L. \*Landau, L., and Lifšic, E. Statističeskaya fizika (klas-  
sičeskaya i kvantovaya). [Statistical physics (classical  
and quantum)]. Gosudarstv. Isdat. Tehn.-Teor. Lit.,  
Moscow-Leningrad, 1951. 479 pp. 14.75 rubles.

The present volume (the 4th in a series on Theoretical  
Physics) contains the revised and considerably enlarged  
material of an earlier book of the authors published under  
the same title [Oxford, 1938]. Whereas the first edition  
contained a unified theory of thermodynamics and classical  
statistical mechanics following to a large extent the ideas  
of Gibbs, the present volume includes also quantum sta-  
tistics. Frequently, a classical result is immediately followed  
by the quantum statistical reformulation. Elegant but ap-  
proximate mathematical methods make it possible to cover  
a large number of applications in comparatively small space.  
The problems connected with the macroscopic electric and  
magnetic properties of matter are left for another volume.  
A selection of topics follows: Gibbs distributions leading to  
thermodynamics, increase of entropy, a fact asserted to  
present a paradox, thermodynamic transformations by  
means of Jacobians. Thermodynamic inequalities, Nernst  
theorem, rotating bodies, relativistic generalizations, per-  
turbation methods in the partition sum, various types of  
ideal gases, solids, phonons, superfluidity on the basis of  
phonon and Bose-type energy spectrum of quantum liquid.  
(It is emphasized that the Bose-type spectrum may not be  
necessarily connected with the statistics of the constituent  
particles.) The two-fluid model is not treated. Negative

(OVER)

temperatures. Classical and quantum non-ideal gases, second virial coefficients, Coulomb interaction, Debye-Hückel theory. Phase equilibrium, critical points. Solutions, types of equilibrium curves. Chemical equilibrium. Properties of matter at high temperatures and densities with astrophysical applications. Fluctuations, Gaussian distributions, Poisson formula, correlation of fluctuations, fluctuations at the critical points (the theory is based on the "capillary" effect of Rocard rather than on Ornstein-Zernicke's correlation effects). Radial distribution functions in ideal quantum gases. Correlations in time. Onsager type thermodynamics of irreversible phenomena, dissipation function. The role of symmetry in solids, crystal classes. Phase transitions of the second kind are treated only on the basis of Landau's expansion of the Gibbs function around the critical point. Ehrenfest type discontinuities are found for the specific heat rather than singularities as in more rigorous theories. The latter cast doubt on the validity of Landau's expansion, since the Gibbs function is presumably singular at the critical point [cf., e.g., Smoluchowski, Mayer, and Weyl, *Phase transformations in solids*, Wiley, New York, 1951, p. 1]. Surface effects in fluids and crystals. The average length of long-chain molecules. There are a large number of solved problems. Bibliography is almost completely absent.

*L. Tisza* (Cambridge, Mass.).

SA

530.145 : 537.122

7561. Interaction between an electron and a positron.  
V. B. BERISTETSKII and L. D. LANDAU. *Gulke Russ. Sci. Period Lit. (Brookhaven)* 4, 33-9 (Feb., 1951).  
Full English translation of the article abstracted as Abstr. 1304 (1950).

ASH SLA METALLURGICAL LITERATURE CLASSIFICATION

530.145 : 537.122

530.145 : 537.122

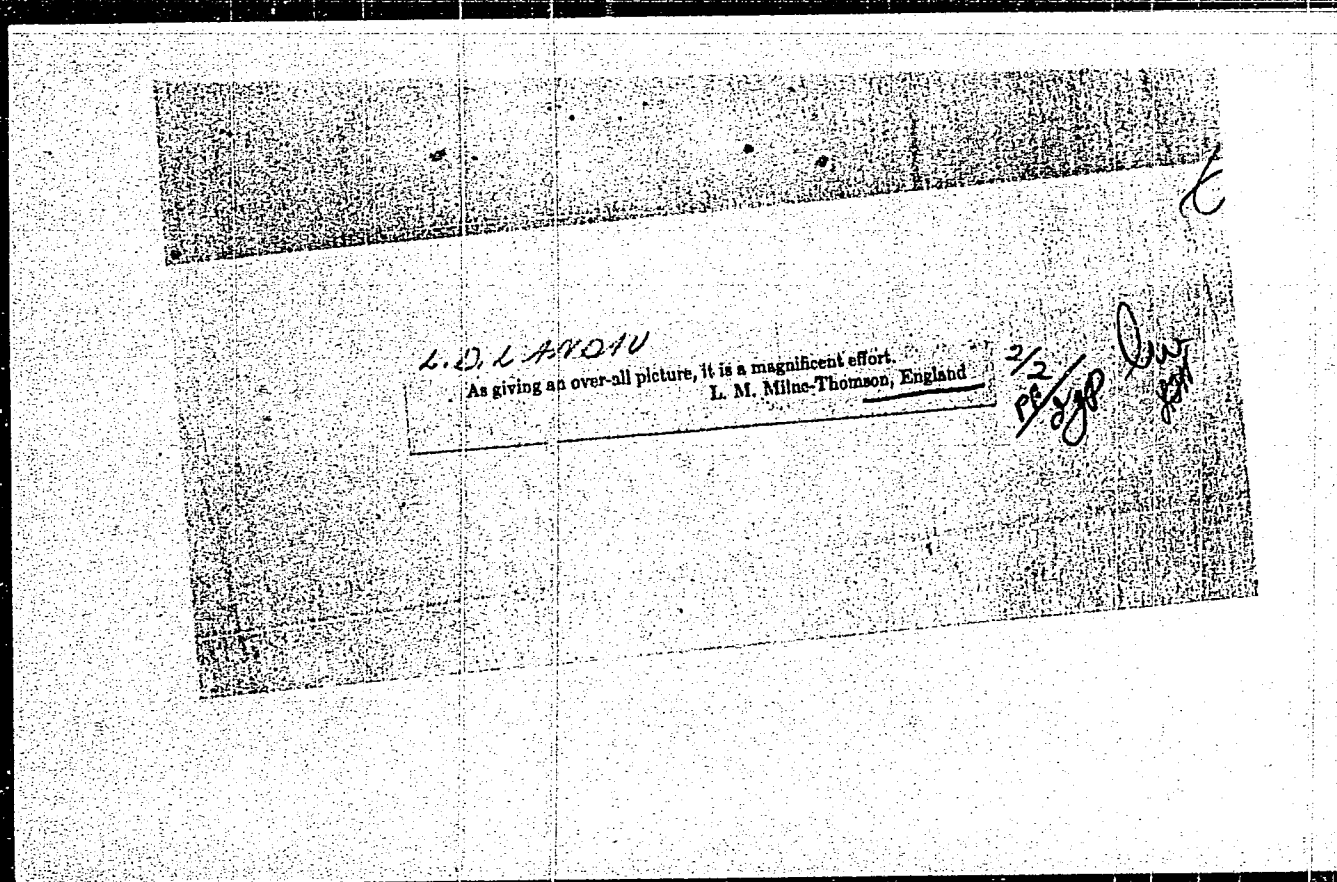
LANDAU, L. D.

✓ 62910. Landau, L. D., and Lifshitz, E. M., The mechanics of continuous media (Mekhanika sploshnykh sred), 2nd ed., Moscow, Gosud. Izdat. Tekh.-Teor. Lit., 1953, 783 pp. 16.35 rublé.

① Book treats the theory of motion of fluids and gases (hydrodynamics) and solid material (elasticity). The chapters on hydrodynamics are: (1) Ideal fluids; (2) Viscous fluids; (3) Turbulence; (4) Boundary layer; (5) Heat conduction; (6) Diffusion; (7) Surface phenomena; (8) Sound; (9) Shock waves; (10) One-dimensional gas flow; (11) Surfaces of discontinuity; (12) Plane gas flow; (13) Flow about a finite body; (14) Combustion; (15) Relativistic hydrodynamics; (16) Superfluidity; in all, 628 pages. Elasticity is confined to infinitesimal strain and comprises: (1) Basic equations; (2) Equilibrium of rods and plates; (3) Elastic waves; (4) Heat conduction; in all, 156 pages.

To cover such a vast field the treatment has to be concise. Nevertheless, the exposition is a model of clarity. Approximate and empirical methods are not treated and, to the authors' credit, they never seem to lose sight of the physical background. The book is clearly intended for physicists, but, in spite of the number of worked problems, it is difficult to see to what class of worker the book will appeal. In any one division there is too little for the specialist, while the whole could prove indigestible to the tyro.

(7.1.12)



LANDAU, L.D.

USSR

5195

AEC-tr-2150

ON THE MULTIPLE PRODUCTION OF PARTICLES DURING  
COLLISIONS OF FAST PARTICLES. L. D. Landau. Trans-  
lated by M. Hamermesh from Izvest. Akad. Nauk S.S.R.  
Ser. Fiz. 17, 51-64(1953). 27p.

A method is suggested for determining the total number of particles produced in the collision of fast particles without a detailed examination of the motion of the system. The method is based on the assumption that the motion of the system for a short time after the collision can be considered in the same manner as the motion of an ideal liquid. It is shown that the total number of particles in a star is equal to a constant multiplied by the total entropy of the system. The special cases of collisions of 2 protons and of 2 identical nuclei are considered. Expressions are derived for the angular and energy distributions of the produced particles. (M.P.G.)

Rmt

Inst-Physical Problems in Vainlov, AS USSR

LANDAU L.D.

USSR

550. Radiation of  $\gamma$ -rays upon collision of fast  $\pi$ -mesons with nucleons. L. D. LANDAU AND I. YA. POMERANSKIY. Zh. ekspt. i teoret. fiz., No. 5, 505-15 (1953) In Russian.

The bremsstrahlung of  $\gamma$ -rays is calculated for  $\pi$ -mesons which are absorbed by a "black" nucleon and, therefore, produce diffraction scattering. For large energies,  $E \gg \mu$ , where  $\mu$  is the  $\pi$ -meson rest energy, it is shown that only the region outside the nucleon contributes appreciably to this process, and the  $\pi$ -meson wave-function is known in this region as a sum of plane waves and diffracted waves. Radiation accompanying the capture of the  $\pi$ -meson is also calculated. The differential cross-section for radiation is found to be small compared to  $\sigma_R$  except for small angles,  $\theta < \mu/E$ , where it becomes large with increasing energy.

O. J. BROWN

AmL

KOSTRYUKOVA, M. O., STRELKOV, P. G., LANDAU, L. D., akademik

Thermal capacity of solid oxygen below  $4^{\circ}$ . Dokl. AN SSSR 90 no.4:525-528  
Je '53. (MLRA 6:5)

1. Akademiya Nauk SSSR (for Landau). 2. Institut fizicheskikh problem im.  
S. I. Vavilova Akademii nauk SSSR (for Kostryukova, Strelkov).  
(PA 56 no.672:8384 '53)

LIFSHITS, I.M.; KAGANOV, M.I.; LANDAU, L.D., akademik.

Kinetics of the destruction of superconductivity by a high-frequency field.  
Dok.AN SSSR 90 no.4:529-531 Je '53. (MLBA 6:5)

1. Akademiya Nauk SSSR (for Landau).

(Electric conductivity)